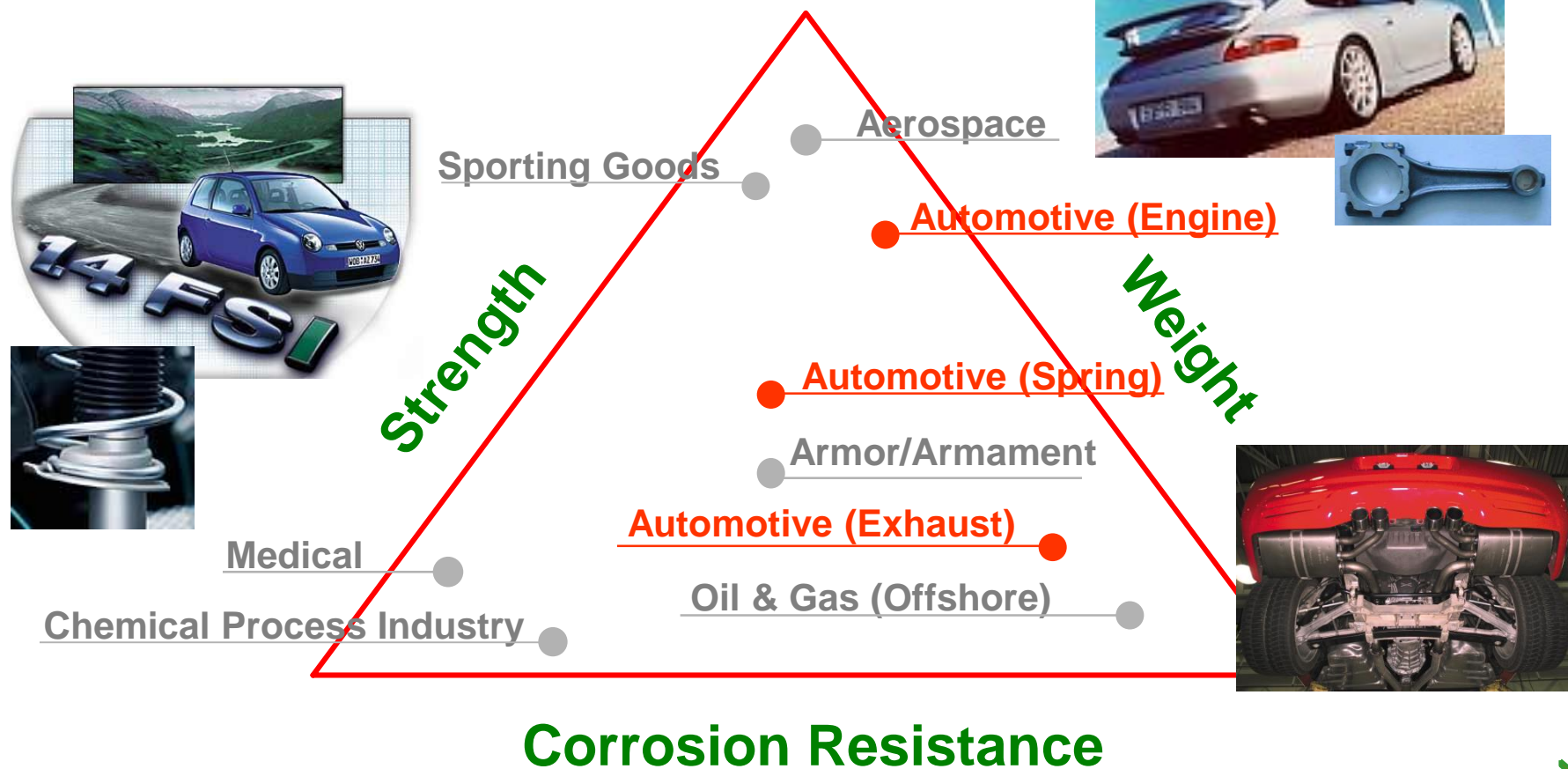


Affordable Titanium – A TIMET Perspective

Titanium in Transportation

- A Proven Weight Saving Solution in high performance automotive
- Cost premium for installed components is 2X to 10X vs. incumbent metals
- Transition to sustained series production not yet achieved



Titanium 2005

Vmmroooooommm

Every ounce counts on Yamaha's meanest motocross bike

LOS ANGELES — Another landmark in the consumer vehicle market has been claimed for titanium with the addition of the rear suspension spring on production versions of certain Yamaha Motor Co. Ltd. motorcycles.

By Frank Haflich

Titanium Metals Corp. (Timet), Denver, said the 2006 Japanese-built Yamaha YZ model motocross bikes are the first cycles anywhere with titanium springs as original equipment.

Made of Timetal LCB (low-cost beta), an alloy supplied by the company's Timet Automotive unit in Morgantown, Pa., the "shock springs" typically weigh 30 percent less than their chrome-silicon-steel counterparts on Yamaha's comparable 2005-model bikes.

As its name indicates, Timetal LCB (6.8 molybdenum-4.5 iron-1.5 aluminum) is a lower-cost version of high-strength Beta-C titanium originally developed for aerospace uses. Its first automotive application was in rear suspension springs on the 2001 Volkswagen Lupo FSI and, more recently, the 2004 Ferrari Challenge Stradale, its initial use on a production car.

The springs are supplied to Iwata, Japan-based Yamaha by Chuo Spring Co. Ltd., Nagoya, Japan. Timetal LCB is typically melted at Timet's Henderson, Nev., operations, but Timet emphasizes that it is capable of producing the alloy in all of its melt shops around the world. While conversion of LCB ingot into billet has taken place both at Timet and externally, Timet's source for rolling the billet into elastically wound wire coils has been Perryman Co.,



'SHOCK SPRINGS': The YZ models are the first cycles anywhere outfitted with titanium springs as original equipment.

Washington, Pa.

Kurt Faller, president of Timet Automotive, said the new Yamaha suspension spring is evidence that titanium "offers proven and straightforward solutions to a variety of weight-reduction and performance-improvement challenges."

The Timetal LCB springs are wound into shock springs on automatic computer numerical control (CNC) machines the

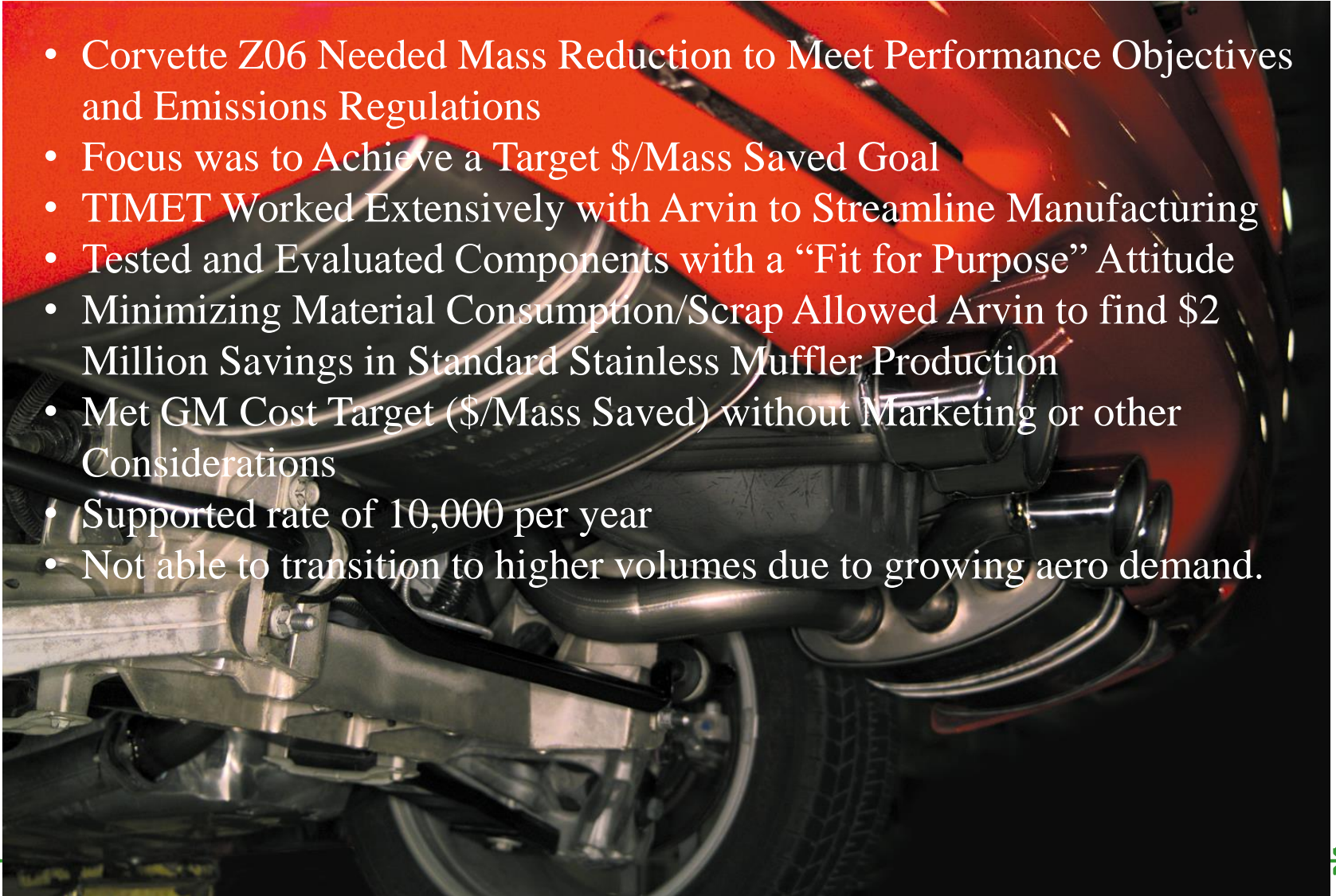
LCB for the 2006 Yamaha YZ450

- Formulated for affordable performance using low cost raw materials
- Manufactured using continuous processing for economies of scale
- Spring wound on CNC machines used for steel
- Delivers affordable weight savings for high performance vehicles.
- Not sustained due to lack of infrastructure



Corvette Z06 – 2001/02

- Corvette Z06 Needed Mass Reduction to Meet Performance Objectives and Emissions Regulations
- Focus was to Achieve a Target \$/Mass Saved Goal
- TIMET Worked Extensively with Arvin to Streamline Manufacturing
- Tested and Evaluated Components with a “Fit for Purpose” Attitude
- Minimizing Material Consumption/Scrap Allowed Arvin to find \$2 Million Savings in Standard Stainless Muffler Production
- Met GM Cost Target (\$/Mass Saved) without Marketing or other Considerations
- Supported rate of 10,000 per year
- Not able to transition to higher volumes due to growing aero demand.



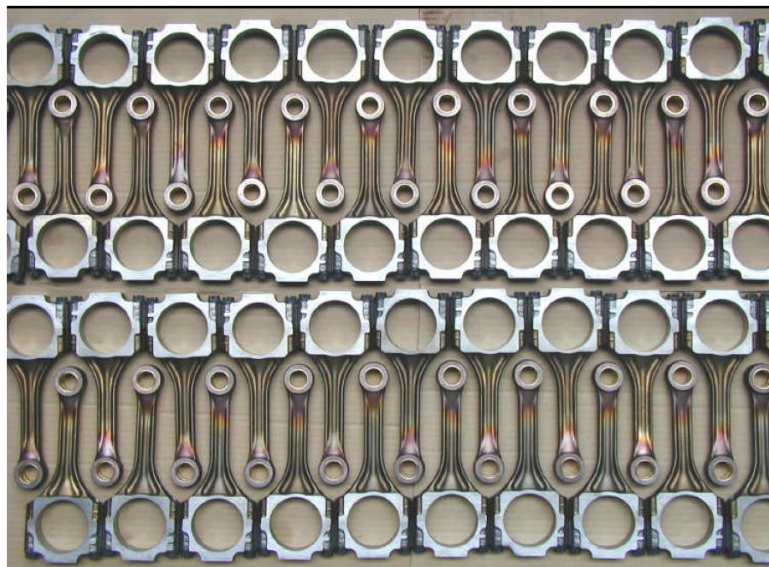
1. Engine for testing titanium connecting rods
2. Variation of design
3. Run out of thread
4. Typ of thread
5. Bore
6. Fretting piston - connecting rod
7. Fretting bearing - connecting rod
8. Preproduction



1,6 L – 92kW- engine

application:

Lupo - GTI



engine test ✓

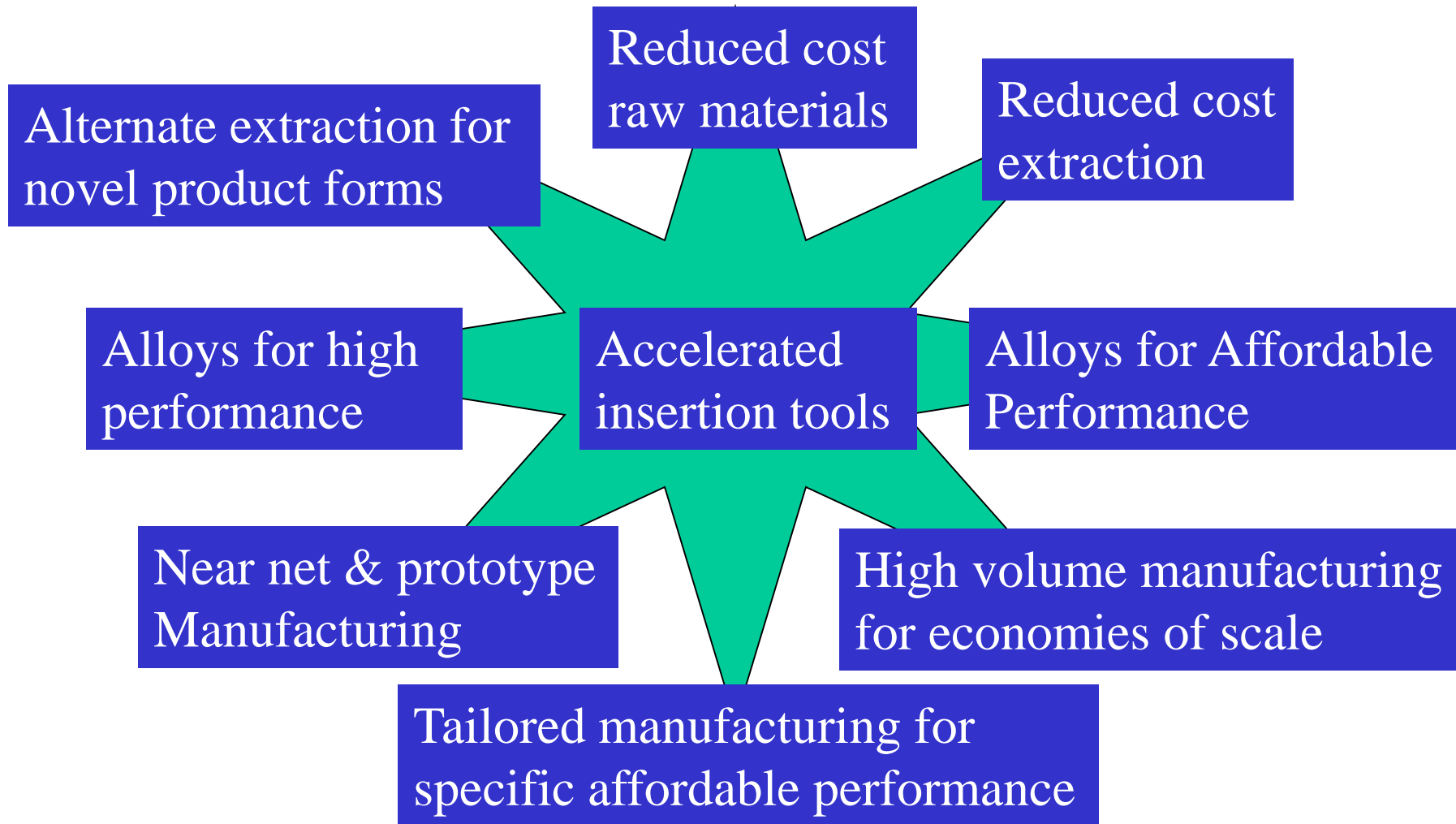
on road test ✓

Proposed to VW Management for
Standard Production circa 2002
VW leadership changed and focus
moved away from titanium technology

M. Scholz et al Titanium 2003

Integrated Development Approach.

Aligned Strategy and focused funding required



Key Points

- Cost of titanium metal units is between 40 and 60% of mill products and more for components with high “buy to drive” ratio

Lower the cost of metal units

- Cost to manufacture: Individual applications can be made attractive by innovating in the design and manufacturing space.

Integrated, innovative “Fit for Purpose” approach
Recognize and plan for the infrastructure challenges

- Transition to series production requires sustained and consistent industry strategy and targeted funding

Learn from the aluminum experience